

Degradation of methyl orange mediated by CuO-doped ZnO photocatalysts.

ABSTRACT

0.5 - 2.0% CuO-doped ZnO (CuO-ZnO) photocatalysts were prepared with a simple mixing method where the oxides were initially synthesized through precipitation. The physico-chemical properties of CuO-doped ZnO photocatalysts were studied via XRD, TEM, XRF and BET method and their photoactivity was evaluated by degrading methyl orange (MO) dye. The properties of ZnO were not affected by the addition of CuO except for the particle size of the photocatalyst, which increased proportionally with CuO. In a photoactivity study, 1.0% CuO-ZnO photocatalyst has the highest degradation rate with the optimum mass loading of 1.5 g L⁻¹. Increasing the initial concentration of MO reduced photocatalysts' photoactivity. The degradation of MO followed the pseudo-first order reaction. The photoactivity of CuO-ZnO was maintained until the fifth cycle, which indicates that it is a very stable compound.

Keyword: Copper oxide; Degradation; Methyl orange; Photocatalyst; Zinc oxide.